REMARKS

Claims 1-6, and 8-10 have been rejected. Claim 7 has been objected to as depending upon a rejected base claim, however, the Examiner has indicated that claim 7 contains allowable subject matter. Claims 11-15 have been added. Applicant has amended claims 1 and 5-10 to more particularly point out and distinctly claim the invention. Claims 1-15 remain pending in the application. Applicant respectfully requests reconsideration of claims 1-15 in light of the following remarks.

The Examiner principally rejected claims 1 and 5 under 35 U.S.C. § 103(a) in view of U.S. Patent No. 5,611,027 to Edgar ("Edgar"). The Examiner reads Edgar to disclose each of the limitations of claims 1 and 5, and in particular reads col. 6, line 44 through col. 7, line 10 of Edgar to disclose the limitation "receiving a dithering mask corresponding to the source image, wherein the dithering mask contains dithering levels specifying the degree to which colors in corresponding regions of the source image can be dithered to paint the output image" recited in claim 1, and the limitation "receiving a dithering level from a corresponding pixel in a dithering mask associated with the source image, wherein the dithering level specifies on a per pixel basis the amount of the pixel's color error to diffuse to neighboring pixels; and calculating a color error from the target color, paint color and dithering level" recited in claim 5. The Applicant respectfully disagrees for the reasons noted below.

Claims 1 and 5 have been amended, merely to more distinctly claim and particularly point out the invention. Claim 1, as amended, recites a method for generating an output image from a source image, comprising, "receiving a dithering mask corresponding to the source image, wherein the dithering mask contains a plurality of dithering levels specifying the degree to which colors in corresponding regions of the source image can be variably dithered to paint the output image." Claim 5, as amended, recites a method for generating an output image from a source image, comprising, "receiving a dithering level from a corresponding pixel in a dithering mask associated with the source image, wherein the dithering level specifies the amount of the output pixel's color error to diffuse to neighboring pixels; and calculating a color error to diffuse

to neighboring pixels in the output image from the target color, the paint color, and the dithering level."

The specification discloses that the amount of dithering applied to the colors in a region of an output image can be "controlled by the dithering level specified in" a corresponding region of a dithering mask associated with the source image. (*Specification*, p. 6, ll. 3-4). For example, one region of a dithering mask can "specify a dithering level of 0. In [which] case, [an] image conversion application 350 will apply 0% dithering to" a corresponding region of the output image. (*Id.* at ll. 4-7). When this occurs, none of the color error from neighboring pixels is diffused to the output pixel, which is therefore painted with a color that is "closest in color to the color of the corresponding pixel" in the source image. (*Id.* at ll. 9-11). Similarly, the specification discloses that the dithering mask "can specify [an 8-bit] dithering level of 255. In [which] case, image conversion application 350 will apply 100% dithering to" a corresponding region of the output image. (*Id.* at ll. 14-17). When this occurs, "image conversion application 350 will diffuse to subsequent pixels in [the output] image 100% of the color error resulting from painting a pixel" in the output image with its nearest matching color in the target palette. (*Id.* at ll. 17-21). More generally, the specification discloses that a "user can alter the amount of dithering applied to the colors of [an output image] on a pixel by pixel basis by specifying per pixel dithering levels in [an associated] dithering mask." (*Id.* at ll. 29-30)

In contrast to the variable dithering method disclosed by Applicant, conventional dithering methods do not allow a user to specify the amount of dithering that can be applied to the colors of an output image on a regional or pixel by pixel basis. For example, in the Floyd-Steinberg algorithm discussed in the specification, "7/16 of [an output image] pixel's color error is diffused to the pixel to its immediate right, while 3/16 of the color error is diffused to the pixel immediately below and to the left, 5/16 is diffused to the pixel immediately below, and 1/16 is diffused to the pixel immediately below and to the right." (Spec., p. 7, ll. 16-20). Thus, in the Floyd-Sternberg algorithm 100% of an output image pixel's color error (7/16 + 3/16 + 5/16 + 1/16 = 16/16) is diffused to its neighboring pixels, and there is no mechanism for specifying on a regional or per pixel basis the amount of color error that can be diffused to or received from neighboring pixels. Consequently, conventional prior art dithering algorithms fail to "specif[y] the degree to which colors in corresponding regions of the source image can be variably dithered

to paint the output image" as recited in claim 1, or to calculate on a per pixel basis the "color error to diffuse to neighboring pixels in the output image from the target color, the paint color, and the dithering level" as recited in claim 5.

As discussed above, the Examiner reads Edgar to disclose "specifying the degree to which colors in corresponding regions of the source image can be variably dithered to paint the output image" as recited in claim 1, or calculating on a per pixel basis the "color error to diffuse to neighboring pixels in the output image from the target color, the paint color, and the dithering level" as recited in claim 5, at col. 6, line 44 through col. 7, line 10. However, as explained below, that passage of Edgar teaches nothing more than using a conventional dithering algorithm such as an error diffusion algorithm to map a large number of gray scale values in an 8-bit mask (255) to a smaller number of grayscale values in a 2-bit mask (3) in the same way conventional dithering algorithms are used to map a large number of colors (16 million) in a 24-bit color image to a smaller number of colors (256) in an 8-bit color image.

In general, the Edgar patent is directed toward "performing image enhancement processing on a portion of an image without leaving a cut-out appearance on the enhanced image." (Col. 1, ll. 10-14). To appeal to the widest possible market, Edgar "combine[s] a fuzzy mask with instantaneous feedback for the imaging effect." (Col. 2, ll. 1-3). To do this, Edgar divides his image into "two or preferably three different areas", namely, a masked area, an unmasked area, and a transition region area. (Col. 2, ll. 23-30). Each area is defined by its own color palette. (Id. at ll. 30-32). Initially, the masked, unmasked and transition region areas are defined by a user. (Col. 6, ll. 45-52). However, after the user defines these areas, "an error diffusion or dithering algorithm ... is performed to reassign mask pixels of the three areas so that a fuzzy or diffuse effect is achieved between the masked and unmasked areas." (Col. 2, ll. 32-37). Once the error diffusion or dithering algorithm is run, the full effect of an image processing operation such as a change in luminosity is "performed on the palette corresponding to the unmasked area [while] no image operation [is] performed on the palette corresponding to the masked area, and a partial effect is performed on the transition region palette." (Id. at ll. 40-44).

At col. 6, line 44 to col. 7, line 10, Edgar is concerned with not only defining the initial masked, unmasked, and transitional region areas to create a fuzzy image processing effect, (col. 6, ll. 44-52), but with performing a dithering or error diffusion algorithm to provide a user with

instantaneous feedback on the fuzzy or diffusive image processing effect. In particular, Edgar discloses that the masked, unmasked, and transitional region areas can all be delineated within a single mask, "ha[ving] the form of a monochrome image." (Col. 6, l. 60). For example, the different areas can be represented by an 8-bit mask, in which the masked areas are represented by the value 0, the unmasked areas are represented by the value 255, and the transitional region areas are represented with a "continuum of values between 1 and 254." (Col. 6, ll. 60-64). However, to achieve "instantaneous display of the fuzzy mask, the value for all pixels is [then] mapped to a small number of states," e.g., to a 2-bit mask having values of 0 (0%), 128 (50%), and 255 (100%). (Col. 6, l. 65 to col. 7, l. 1). To map the large number of values or states in the 8-bit mask to the smaller number of values or states in the 2-bit mask (e.g., the three values 0, 128, and 255), Edgar discloses using a mapping technique such as a "good error diffusion technique to switch the mask pixels between mask areas." (Col. 7, ll. 5-8). In addition to using an error diffusion technique, Edgar discloses that "[d]ithering is an alternate mapping technique which could be used in the invention." (Col. 7, ll. 8-10).

Thus, as claimed above, Edgar at col. 6, line 44 through col. 7, line 10 teaches nothing more than using a conventional dithering method such as an error diffusion method to map a large number of values or states (255) in an 8-bit effect mask to a smaller number of values or states (3) in a 2-bit effect mask (used for instantaneous feedback) in the same way that conventional dithering algorithms are used to map a large number of colors (16 million) in a 24-bit color image to a smaller number of colors (256) in an 8-bit color image. Significantly, Edgar fails to disclose or to even suggest using a variable dithering method such as the method disclosed and claimed by the Applicant to variably dither an output image on a regional or per pixel basis by specifying a variable dithering level in a dithering mask. In particular, Edgar fails to disclose or suggest "receiving a dithering mask corresponding to the source image, wherein the dithering mask contains dithering levels specifying the degree to which colors in corresponding regions of the source image can be dithered to paint the output image" as recited in claim 1, or "receiving a dithering level from a corresponding pixel in a dithering mask associated with the source image, wherein the dithering level specifies on a per pixel basis the amount of the pixel's color error to diffuse to neighboring pixels; and calculating a color error

from the target color, paint color and dithering level" as recited in claim 5. Consequently, Applicant's claims 1 and 5 are patentable over Edgar for at least this reason.

Moreover, claims 2-4 depend from and contain all the limitations of claim 1, while claims 6-8 depend from and contain all the limitations of claim 5. Consequently, claims 2-4 and 6-8 are respectively patentable over Edgar for at least the same reasons that claims 1 and 5 are patentable over Edgar. Additionally, claims 9 and 10 are Beauregard claims that recite computer program products comprising instructions operable to cause a programmable processor to perform the methods that are recited in claims 1 and 5, respectively. Consequently, claims 9 and 10 are patentable over Edgar for at least the same reasons that claims 1 and 5 are patentable over that reference. Finally, new claims 11-12 are Beauregard claims that depend from and contain all the limitations of claim 9, while claims 13-15 are Beauregard claims that depend from and contain all the limitations of claim 10. Consequently, claims 11-15 are patenable over Edgar for at least the same reasons that claims 9 and 10 are patentable over Edgar (i.e., for the same reasons that claims 1 and 5 are patentable over that reference as discussed above.)

Applicant respectfully submits that all claims are in condition for allowance, and kindly requests the Examiner to allow all claims to issue.

REQUEST FOR CONSIDERATION OF PRIOR ART SUBMITTED ON DECEMBER 13, 2000

Applicant submitted an information disclosure statement, complete with a PTO form 1449, when he filed the application on December 13, 2000. Applicant notes that the Examiner has failed to indicate whether she has considered the prior art submitted in the information disclosure statement of December 13, 2000, and respectfully requests the Examiner to consider that art, and to indicate that such art has been considered by initially the form 1449 previously submitted.